Mimbar PGSD Undiksha
Volume 10, Number 2, Tahun 2022, pp. 367-375
P-ISSN : 2614-4727, E-ISSN : 2614-4735
Open Access: https://doi.org/10.23887/jjpgsd.v10i2.48575

Digital Comics Learning Media Based on Problem Based Learning in Science Subjects for Fourth Grade Elementary School

Kadek Nita Puriasih[1*], I Gede Astawan[2], Gusti Ayu Putu Sukma Trisna[3]

[1,2,3] Pendidikan Guru Sekolah Dasar, Universitas Pendidikan Ganesha, Singaraja, Indonesia

ARTICLE INFO

Article history:
Received March 09, 2022
Accepted June 30, 2022
Available online July 25, 2022

Kata Kunci:
Komik Digital, PBL, IPA

Keywords:
Digital Comics, PBL, Natural Science

ABSTRAK

Kegiatan pembelajaran secara daring materi yang disajikan oleh guru masih sangat terbatas salah satunya pada pembelajaran IPA materi daur hidup hewan. Hal ini membuat siswa kesulitan dalam belajar. Tujuan penelitian ini yaitu mengembangkan media pembelajaran komik digital berbasis PBL pada mata pelajaran IPA materi daur hidup hewan kelas IV sekolah dasar. Jenis penelitian ini yaitu pengembangan dengan menggunakan model ADDIE. Subjek penelitian yaitu para ahli yang terdiri dari 2 ahli materi dan 2 ahli media pembelajaran. Subjek uji coba yaitu 2 praktisi oleh guru dan 5 siswa kelas IV (uji coba perorangan). Metode yang digunakan dalam mengumpulkan data yaitu wawancara, observasi, dan kuesioner. Instrument yang digunakan dalam mengumpulkan data yaitu instrument rating scale. Teknik yang digunakand alam menganalisis data yaitu analisis deskriptif kualitatif dan kuantitatif. Hasil penelitian yaitu penilaian dari ahli materi sebesar 4,83 (sangat baik), dan penilaian dari ahli media sebesar 4,83 (sangat baik). Penilaian dari ahli praktisi mendapatkan skor 4,91 (sangat baik) dan siswa mendapatkan skor 4,93 (sangat baik). Maka, media pembelajaran komik digital berbasis PBL layak digunakan dalam pembelajaran. Implikasi penelitian ini yaitu media pembelajaran komik digital berbasis PBL yang dikembangkan dapat digunakan guru pada pembelajaran IPA khususnya materi daur hidup hewan.

ABSTRACT

In online learning activities, the material presented by the teacher is still very limited, one of which is science learning and animal life cycle material. It makes it difficult for students to learn. This study aimed to develop PBL-based digital comics learning media in science subjects for animal life cycle material for grade IV elementary school. This type of research is developed using the ADDIE model. The research subjects consisted of two material experts and two learning media experts. The trial subjects were two practitioners by the teacher and five fourth-grade students (individual trial). The methods used in collecting data are interviews, observations, and questionnaires. The instrument used in collecting data is the rating scale instrument. The data analysis techniques are descriptive, qualitative, and quantitative. The study's results were the assessment of the material expert of 4.83 (very good) and the assessment of the media expert of 4.83 (very good). The assessment from expert practitioners got a score of 4.91 (very good), and students got a score of 4.93 (very good). It is concluded that PBL-based digital comic learning media is feasible to use in learning.

1. INTRODUCTION

Education is the communication between students and teachers containing educational information and educators being a source of information. Education plays an important role in developing quality human resources and having superior skills (Hudson et al., 2018; Mutakinati & Anwari, 2018; Yang, 2020). Currently, technology can be used in education to help students learn activities (Gavaldon & McGarr, 2019; Yavuz et al., 2021), especially now that we have entered the industrial revolution 4.0 marked by the rapid development of technology. The rapid development of technology makes education must be able to adapt and use technology to improve the quality of education (Fukuda, 2020; Yulianti, 2017; Yulistiana, 2015). Currently, it can be said that learning conditions, especially in Indonesia, have not been optimal due to the Covid-19 virus. The emergence of covid-19 causes learning to be done online so that learning activities can run smoothly even though they are

Corresponding author
*E-mail addresses: nitaprash00@gmail.com (Kadek Nita Puriasih)

done at home (Dhawan, 2020; Yulia, 2020). This distance learning activity is very different from face-to-face learning in schools. It causes students or teachers difficulties in learning activities as usual (Arizona et al., 2020; Hutauruk & Sidabutar, 2020; Muhammad Fikri, Muhammad Zaki Ananda, 2021). The most prominent difference is that the teacher is less able to interact directly with students, so students have difficulty learning and understanding the material presented by the teacher (Primasari &, Zulela, 2019).

But in reality, online learning is still a lot of teachers who have difficulty in teaching (Hutauruk & Sidabutar, 2020; Muhammad Fikri, Muhammad Zaki Ananda, 2021). Teachers have difficulty creating effective online learning activities because teachers are not accustomed to using technology in learning (Mansur et al., 2021; Rigianti, 2020). Parents do not understand the tasks and learning the teacher gives, so it is difficult for parents to explain to their children. It can happen because there are several contributing factors. When learning occurs normally, parents are less involved, and the last education of parents is still low (Harahap et al., 2021; Rosyidiana, 2021), so the level of parents' understanding is still low in the use of online learning applications. Based on the observations made at SD Negeri 1, Poh Bergong also found a problem. In online learning activities, the material presented by the teacher was still very limited, one of which was science learning material for the animal life cycle. Based on the results of interviews conducted with students, it was also stated that teachers only relied on student books available at schools so that students had difficulty understanding science material. In addition, in learning activities, students are less active and not enthusiastic, so students feel bored in learning science. This is unfortunate because technology can help teachers deliver classroom materials, especially in science learning. This problem certainly affects the students' low science learning outcomes, and the learning objectives are not maximally achieved.

The solution is to develop a learning media combined with interesting learning models to achieve maximum learning objectives, especially in science learning. Natural science is a science that studies nature. Through science learning, it is hoped that students will be able to go directly to logical and structured stages to achieve new findings about nature and effective learning goals (Fitriyati & Munzil, 2017; Munir, 2018; Riswanto & Dasmo, 2015). Science learning in elementary schools places more emphasis on real and direct learning experiences through process skills and scientific attitudes in investigating the surrounding environment (Dharsana & Sidabutar, 2018; T. Rahmawati, 2018). Science learning can also give students can solve problems and make good decisions (Candra et al., 2017; Pambudi et al., 2019). In addition, science learning activities can also develop creative and innovative thinking skills to form skilled cognitive students (Dhaniawaty et al., 2021; Lestari et al., 2017). Teachers need interesting and appropriate learning models to support learning activities in learning activities. In choosing a learning model, it is also necessary to pay attention to the type or nature of the material to be delivered so that students can easily follow the learning (Novitasari & Shodikin, 2020; R. Y. Sari et al., 2017). An appropriate learning model can achieve learning objectives and serve as a teacher's guide in systematically carrying out learning activities (Nada et al., 2018; T. Rahmawati, 2018). One of the learning models that can be used is Problem Based Learning (PBL).

Problem Based Learning (PBL) is a learning model that develops critical thinking skills through asking and answering activities so students can solve problems individually or in groups (Ayuningsih, 2020; Diah & Riyanto, 2016). PBL is one of the lessons that give students a problem and expects students to be able to solve these problems through active learning activities and accompanied by teachers as facilitators (Effendi et al., 2021; Juliawan et al., 2017). In addition, this learning model also emphasizes activities to guide students, and learning activities also focus on students so that students can actively participate in learning well (Asyari et al., 2016; Hendriana et al., 2018). This learning activity focuses on active and collaborative creation and invites students to be directly involved in a problem. This PBL model is also oriented to a real problem, thus encouraging students to solve and seek new information about problems that occur in the environment (Gunantara et al., 2019; Suryawati et al., 2020). PBL not only helps students understand and solve problems, but students play a role in exploring their knowledge and skills to increase student learning outcomes. In addition, using the right learning model to achieve maximum learning goals requires appropriate learning media (Haji et al., 2015; Nurlaily et al., 2019). One learning media that can be used is digital comics.

Learning media is a tool that can facilitate teachers in conveying information or material to students. The use of learning media aims to make communication between teachers and students effective in learning activities (Blaschke & Hase, 2019; Hosen et al., 2021). In addition, the function of the media is to increase student stimulus in learning so that students can understand the lesson well and improve student learning outcomes (Megawati & Utami, 2020; Prasasti et al., 2019). Learning media is also an alternative that teachers can use in delivering learning in class so that students more easily accept the learning delivered by the teacher (Darmaji et al., 2019; Kamelia, 2019). Digital comic media is one form of audio-visual media that can be used in learning activities because it follows the times (Kanti et al., 2018; Sukmanasa et al., 2017b). Comic learning media is a medium that contains illustrated stories consisting of several characters in the story. Digital comics are one of the media that utilize technology in the form of millennial socialization media that can be accessed by students anywhere and anytime (Azizul et al., 2020; Sukmanasa et al., 2017a). Digital comic media presents learning information in the form of sequential picture stories which contain information about learning and are made using computer assistance ("Pengembangan Komik Digital Pelestarian Lingkungan Berbasis Nilai Karakter Religi Untuk Pembelajaran Tematik Pada Siswa Sekolah Dasar," 2019; Wahyudin et al., 2020). The advantage of this

comic media is that it can arouse students' interest in learning and help students understand abstract concepts. Besides digital comics, they are also fun so that learning becomes interesting.

Previous research findings also state that the right learning media supports learning activities (Satyawan, 2018; Wang et al., 2020). Other research findings also state that digital comics can improve students' learning atmosphere to be fun (Aeni & Yusupa, 2018; Sukmanasa et al., 2017b). Other research findings also state that PBL is a learning model that can improve students' critical thinking skills in solving problems to improve student learning outcomes (Silva et al., 2018; Skinner et al., 2015). There is no study on PBL-based digital comic learning media in science subjects for fourth-grade elementary school animal life cycles. The advantage of this research is that the digital comic media that will be developed is packaged attractively through illustrated stories with unique characters to attract students' attention to learning. In addition to this, digital comic media is durable and not easily damaged because it is presented on the website. This study aims to develop PBL-based digital comics learning media in science subjects for animal life cycle material for the fourth grade of elementary school. It is hoped that PBL-based digital comics can help students learn during the covid-19 pandemic.

2. METHOD

This research type uses the ADDIE model, which includes the analysis, design, development, implementation, and evaluation stages (Sari et al., 2020). The research subjects consisted of two material experts and two learning media experts. The test subjects were two practitioners by the teacher and five fourth-grade students at SD Negeri 1 Poh Bergong. The methods used in collecting data are interviews, observations, and questionnaires. Interviews and observations were used to determine the clarity of problems experienced by students and teachers in learning activities. Questionnaires were used to collect data regarding the developed digital comic media. The instrument used in collecting data is the rating scale instrument. The instrument grid developed is presented in Table 1, and Table 2.

Table 1. Material Expert Digital Comic Media Validation Sheet

No.	Aspect	Indicator	Item number
1	Materi/Isi	Identity equipment	1 2 3, 4, 5
2	Penyajian	Clarity of delivery of learning objectives	6, 7 8
3	Penggunaan Bahasa	Clarity of material delivery	9, 10, 11 12
		Total	**12**

(Modified from Rosyida, 2019)

Table 2. Media Expert Validation Instruments

No.	Aspect	Indicator	Item Number
1	Text and voice clarity	The clarity of the text presented	1
		Narrator's voice clarity	2
		The suitability of the music and sound effects used	3
2	Visual quality	The clarity of the illustrations presented	4
		The attractiveness of the background display	5,6
		The integration of the use of color	7
3	Character	Character selection	8,9
		The attractiveness of the characters	10
4	Overall view	Overall look	11,12
		Total	**12**

(Modified from Rosyida, 2019)

The content validity test of the instrument was carried out using the Gregory formula. Based on the evaluator's calculation of the content validity test, the instrument content validity coefficient is 1.00 (very high). The data analysis techniques are descriptive, qualitative, and quantitative. Descriptive qualitative analysis techniques were used to collect data regarding suggestions from experts, practitioners, and teachers. A descriptive quantitative analysis technique was used to process the scores obtained through expert sheets. The score that has been obtained is then converted to a five-scale conversion guideline (Mukholifah et al., 2020).

3. RESULT AND DISCUSSION

Result

This study developed a Problem Based Learning-based digital comic learning media in science subjects. This animal life cycle material was developed based on needs analysis using the ADDIE model. First, analysis. Based on the analysis results, it was found that fourth-grade teachers at SD Negeri 1 Poh Bergong only used media taken from YouTube, which was then given to students. Sometimes teachers also only use textbooks to provide learning materials. There are no special learning media used on the topic of animal life cycles. The results of the curriculum analysis are Basic Competencies and Competency Achievement Indicators as a reference in developing Problem Based Learning-based digital comic learning media. Basic Competencies and achievement indicators are presented in Table 3.

Table 3. Basic Competencies and Indicators of Competency Achievement

Basic Competencies	Indicators of Competency Achievement
3.5 Describe the life cycle of some animals in the surrounding environment.	3.5.1 Explain the process of the animal life cycle. 3.5.2 Analyzing animal life cycle processes.

Second, design. In this stage, the activities design digital comic learning media based on Problem Based Learning. The steps in making digital comic media based on Problem Based Learning are: first, compiling a narrative or storyline from digital comic media according to the predetermined material made in Microsoft Word. Second, making original characters begins with manual design and digitization using Adobe Photoshop. Third, the background from the comic media is made according to the story that has been made so that several different location backgrounds are used in the comic. Fourth, the preparation of materials to be made into comics is by collecting materials that will be used in making digital comics, such as pictures, comic backgrounds, types of writing to be used, cartoon characters that have been made, sound recordings, or dubbing of each character and pictures—other supporters. The design of PBL-based digital comic learning media is presented in Figure 1.

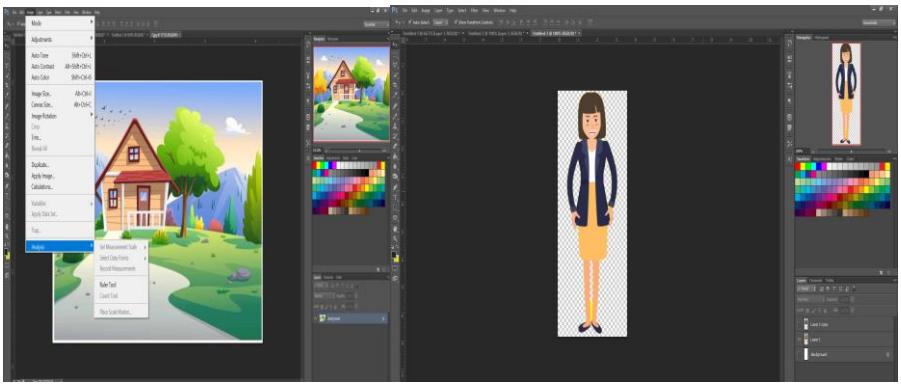

Figure 1. Design of PBL-Based Digital Comic Learning Media

Third, development. This stage develops PBL-based digital comic learning media according to a predetermined design. The preparation of comics starts from preparing the comic background that has been completed and then entered into Microsoft Word. All materials that have been collected are arranged in Microsoft Word. The preparation of comics starts with making word balloons for writing using shapes and text boxes. Convert comics that have been compiled in Microsoft Word and then convert them into pdf format to make it easier to create digital comics later. Digital comics completed in pdf format are then developed into digital comics using the Flip PDF Corporate Edition application. Adding previously recorded audio using the Flip PDF Corporate Edition application adds voice or dubbing for each character in the comic. Add back sound or music to digital comics using the Flip PDF Corporate Edition application. Publish digital comics using the Flip PDF Corporate Edition application. Digital comics that have been completed will then be published and accessed by HTML to get links from digital comic media that have been published and can then be accessed online. The PBL-based digital comic learning media that has been developed is presented in Figure 2.

The PBL-based digital comic learning media that has been developed is then tested for validity by experts. The results of the assessment from the material expert were 4.83, which was in very good qualification, and the assessment from the media expert got an average score of 4.83, which was a very good qualification. Based on the assessment results from expert practitioners, they got a score of 4.91, which was a very good qualification. Based on the assessment results of five students, an average score of 4.93 is a very good qualification. It is concluded that PBL-based digital comic learning media is feasible to use in learning.

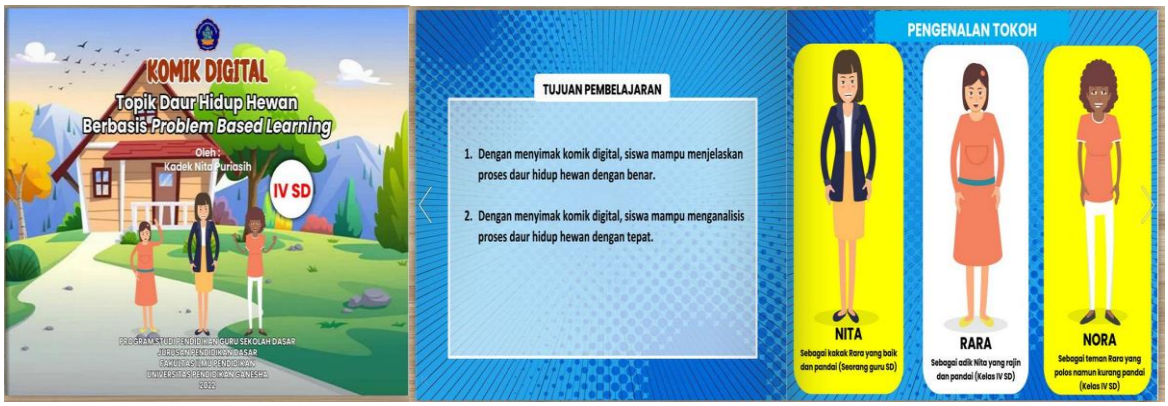

Figure 2. PBL-Based Digital Comic Learning Media

Discussion

PBL-based digital comic learning media is feasible to use in learning due to several factors. First, PBL-based digital comics learning media is feasible to use in learning because it helps students learn science. Comic media also combines the PBL model, one of the learning models that develop critical thinking skills through asking and answering activities so that students can solve problems individually or in groups (Ayuningsih, 2020; Diah & Riyanto, 2016). It causes students to understand the learning material more easily. An appropriate learning model can achieve learning objectives and serve as a teacher's guide in systematically carrying out learning activities (Nada et al., 2018; T. Rahmawati, 2018). Based on the aspect of language use, the language presented in the media is very clear so that it is easy for students to understand. Previous findings also state that the clarity of the language aspect of the media makes it easier for students to understand the learning material (Azizul et al., 2020; Nuraeni & Habibi, 2021; Rahmawati, 2018). In addition, this comic media is also equipped with a sound feature, making it easier for students to understand the material presented. This media provides examples that make it easier for students to understand the material. Previous findings also state that real examples presented in the media can make it easier for students to understand learning materials (Ambaryani, 2017; Rosyida, 2019). The examples presented are often encountered by students in everyday life so that they can improve their problem-solving skills.

Second, PBL-based digital comic learning media is feasible because it increases the spirit of learning from the visual aspect of digital comic media developed using appropriate colors and images. It is supported by findings that state that the suitability of colors and images presented in the media can increase students' enthusiasm for learning (Mujahadah et al., 2021; Wicaksono et al., 2020). In addition, the color suitability presented in the comics follows the characteristics of students, attracting students' interest in learning. Using varied and not monotonous colors interests students, which adds to the student's attention to learning (Handayani & Koeswati, 2020; Mulyati et al., 2021). In addition, the attractiveness of the animation presented in the comics is also very clear and not boring. Other research also mentions that good characterization and presentation can make the media more attractive (Nendasariruna et al., 2018; Ruiyat et al., 2019). In addition, the learning model used in the media emphasizes the activities of guiding students, and learning activities also focus on students so that students can actively participate in learning and increase students enthusiasm for learning (Asyari et al., 2016; Hendriana et al., 2018). Digital comic media presents learning information in the form of sequential picture stories which contain information about learning and are made using computer assistance ("Pengembangan Komik Digital Pelestarian Lingkungan Berbasis Nilai Karakter Religi Untuk Pembelajaran Tematik Pada Siswa Sekolah Dasar," 2019; Wahyudin et al., 2020). This can increase students' enthusiasm for learning.

Third, PBL-based digital comic learning media is appropriate for use in learning because it creates an active learning atmosphere. The media developed is flexible to create a fun learning atmosphere (Lesmono et al., 2018; Udayani et al., 2021). In addition, this media can also be accessed via cellphone or laptop, making it easier for students to learn (Hobri et al., 2019; Ntobuo et al., 2018). In addition, the PBL model is oriented to a real problem, thus encouraging students to solve and seek new information about problems that occur in the environment (Gunantara et al., 2019; Suryawati et al., 2020). It causes the student's learning atmosphere to be active and fun. Learning media is also an alternative that teachers can use in delivering learning in the classroom so that students are more receptive to learning and create a fun learning atmosphere (Darmaji et al., 2019; Kamelia, 2019; Taufiq et al., 2020).

The findings of this study are reinforced by previous findings, which state that the right learning model to achieve maximum learning objectives also requires an appropriate learning media (Haji et al., 2015; Nurlaily et al., 2019). Other findings also state that PBL can help improve students' understanding of learning (Diah & Riyanto, 2016; Hendriana et al., 2018; Juliawan et al., 2017). Other findings also state that digital comics can

stimulate students' learning (Kanti et al., 2018; Sukmanasa et al., 2017b). The advantage of this comic media is that it can arouse students' interest in learning and help students understand abstract concepts presented with storytelling material so that students are more interested in learning. This research implies that the developed PBL-based digital comic learning media can be used by teachers in science learning, especially animal life cycle materials. PBL-based digital comic learning media can attract students' attention when participating in the learning process. Students become more enthusiastic, independent, and enthusiastic when learning online and offline.

4. CONCLUSION

PBL-based digital comic learning media get very good qualifications from experts, teachers, and students. It is concluded that PBL-based digital comic learning media is feasible to use in learning. PBL-based digital comic learning media can help students learn science, especially animal life cycle material.

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